ABSTRACT

A seat belt retractor has a rotatable spool for retraction or pay-out of seat belt webbing wound thereon, depending upon the rotation direction of the spool. A locking wheel is attached to one end of the spool. The spool to is locked to the locking wheel when a crash is sensed. A force limiter allows further payout of the seat belt webbing after the spool has locked to the locking wheel, under the influence of a vehicle occupant's forward momentum. The force limiter includes a torsion bar attached at one end to the locking wheel and at the other end to the spool, and a secondary force limiter mechanism releasably coupled in the force path between the spool and the locking wheel, and a mechanism for de-coupling the secondary mechanism after a predetermined number of turns of the torsion bar. The locking mechanism has a locking element that is resiliently biased to a position wherein it locks the spool to the locking wheel and is held out of locking engagement by the secondary force limiting mechanism. The retractor is converted into a standard locking retractor after load limiting ensuring that the vehicle occupant is securely restrained against secondary impacts.